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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re Application of: Giammaressi

Serial No.: 09/406,353

Confirmation No.: 1515

Filed: September 28, 1999

For: SERVICE RATE CHANGE
METHOD AND APPARATUS

Group Art Unit: 2613

Examiner: Senfi, Behrooz, M

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Dear Sir:

APPEAL BRIEF

Appellant submits this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 2613 dated October 3, 2003, finally rejecting claims 17-22, 24-36, and 38-44. Please charge the fee of \$165.00 for filing this brief to Deposit Account No. 50-1316/DIVA/044. Three (3) copies of this brief are submitted for use by the Board.

Real Party in Interest

The present application has been assigned to DIVA Systems Corporation of Redwood City, California.

09/406353

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Related Appeals and Interferences

Appellant asserts that no other appeals or interferences are known to the Appellant, the Appellant's legal representative, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

Status of Claims

Claims 17-22, 24-36, and 38-44 are pending in the application. Claims 1-16 were presented in the application as originally filed on September 28, 1999. Claims 1-16 were cancelled in a Preliminary Amendment filed on May 9, 2000, while claims 17-44 were presented in the Preliminary Amendment filed on May 9, 2000. Claims 23 and 37 were cancelled in the response to the Final Office Action on September 15, 2003. Claims 17-22, 24-36, and 38-44 stand rejected in view of several references as discussed below. The rejection of claims 17-22, 24-36, and 38-44 based on the cited references is appealed. The pending claims are shown in the attached Appendix.

Status of Amendments

A preliminary amendment was filed on May 9, 2000. The preliminary amendment cancelled originally filed claims 1-16 and added new claims 17-44. A first amendment was filed on December 12, 2002 in response to the Examiner's first non-final Office Action mailed on September 12, 2002 (paper no. 6). The first amendment amended claims 17, 19, 20, 23, 24, 26-35, 37, 38, and 43. The first amendment included arguments directed at traversing the Examiner's 35 U.S.C. §102 and §103 rejections.

A second amendment was filed on May 12, 2003 in response to the Examiner's second non-final Office Action mailed on February 12, 2002 (paper no. 10). The second amendment amended claims 17 and 30. The second amendment included arguments directed at traversing the Examiner's 35 U.S.C. §103 rejections.

The Examiner responded to Appellant's May 12, 2003 amendment in a Final Office Action dated July 29, 2003 (paper no. 12). In the Final Office Action, the Examiner did not find the Appellant's arguments persuasive, and maintained the 35 U.S.C. §103 rejections for the same references cited in the first non-final Office Action.

An amendment in response to the Final Office Action was filed, on September 15, 2003, where claims 17 and 30 were amended, while claims 23 and 37 were cancelled. The response included additional arguments directed at traversing the Examiner's 35 U.S.C. §103 rejections.

The Examiner responded to Appellant's September 15, 2003 amendment in a first Advisory Action dated October 3, 2003 (paper no. 15). In the first Advisory Action, the Examiner noted that the amendment would be entered for purposes of Appeal, however the amended features are disclosed in the reference, and the Appellant's arguments against the 35 U.S.C. §103 rejections are not persuasive.

Summary of Invention

The present invention overcomes the deficiencies and limitations of the prior art with a method and apparatus for adapting service levels in an information distribution system in response to an amount of bandwidth available within the information distribution system. An interactive information distribution system 100 according to the present invention includes service provider equipment 102, a communications network 104 and subscriber equipment 106_n, where n is an integer greater than zero. Content, such as video and audio content (i.e., multimedia content), is provided from the service provider equipment to the subscriber equipment (i.e., set top terminals) for ultimate viewing and listening by the subscriber on a multimedia device such as a television set, personal computer, laptop, among others.

The service provider equipment 102 contains an information server 108 which is typically a parallel processing computer containing at least one central processing unit 110 and associated memory 112. The server interacts with at least one data storage device 114-1 (e.g., a disk drive array) that generally stores the subscriber information (e.g., video data) that will be recalled and downloaded to the subscriber. Optionally, a plurality of data storage devices 114-2 through 114-M, where M is an integer, may interact with the information server 108. Additionally, within the service provider equipment is a video session manager 122 that provides session control of the information flowing to and from the server (see Appellant's specification page 3, lines 21-34, and FIG. 1).

Specifically, the video session manager 122 (or session manager) is a system providing communications between the provider equipment 102 (e.g., a cable system head end) and one or more set top terminals. The session manager 122 also manages the server content streams transmitted to the one or more set top terminals.

The information server 108 is coupled to the video session manager via data path 116, synchronization clock path 118 and control path 120. The information server 108 provides data streams on data path 116 and a synchronization clock on path 118 in response to requests for information from the video session manager on path 120. The data streams are retrieved from the data storage device 114-1.

The information server 108 includes a video switch 108-SW that is used to multiplex information to be provided via data path 116. In the case of a single data storage unit 114-1, the video switch 108-SW is used to multiplex data retrieved from the single data storage unit 114-1 and any data locally stored (e.g., cache or other storage device) within the information server 108. In the case of multiple data storage units 114-2-114-M, the video switch 108-SW is used to additionally multiplex data retrieved from these units (see Appellant's specification page 4, lines 1-24, and FIG. 1).

The video switch 108-SW has associated with it a maximum bandwidth utilization parameter indicative of a maximum data processing rate. Attempts to operate the video switch 108-SW beyond the maximum data processing rate will cause improper switching, resulting in dropped packets or missing data and other improper operation. In the case of video information, such improper operation will likely result in the presentation of objectionable visual or audio artifacts to a set top terminal requesting the video information.

It is important to note that the data path 116 is capable of providing data up to a maximum bit rate. Thus, the information server 108 is bandwidth constrained by at least the data processing rate of the video switch 108-SW and by the bandwidth of the data path 116. Moreover, other data paths within the system, such as the data path between the data storage unit 114-1 and the information server 108 are also subject to respective maximum data rates. Similarly, other data processing elements within the system, such as memory read and write circuitry (not shown) within the data storage

unit 114-1, are also subject to respective maximum data processing and/or delivery rates (see Appellant's specification page 4, line 25 to page 5, line 7 and FIG. 1).

Referring to FIG. 1, the data storage unit 114-1 is depicted as storing appropriate bandwidth programs 114-1A and minimal bandwidth programs 114-1M. Appropriate bandwidth programs 114-1A comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget that is appropriate to the program in terms of visual or aural encoding quality. For example, a high definition program may be provided, which has been encoded to provide sufficient information such that a high quality presentation of the high definition program may be displayed via the subscriber equipment. By contrast, minimal bandwidth programs 114-1M comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget representing a minimal level in terms of visual or aural encoding quality. For example, a high definition program may be provided, which has been encoded to provide sufficient information, such that only a standard quality presentation of the high definition program may be via the subscriber equipment (see Appellant's specification page 5, lines 8-22, and FIG. 1).

It is noted that these programs may include auxiliary program information, such as fast forward (FF) and rewind (REW) tracks. A FF track comprises, effectively, a temporally sub-sampled version of a main program. A REW track comprises, effectively, a reverse-ordered and temporally sub-sampled version of a main program. Such FF and REW tracks are suitable for enabling FF and REW functionality in the information distribution system 100 of FIG. 1. That is, a subscriber may request that a presently presented program be "fast forwarded" or "rewound" to some future or previous point in the program. The server responsively begins streaming the FF or REW track to the subscriber in response to the request (see Appellant's specification page 5, lines 22-32, and FIG. 1).

The video session manager 122 accomplishes all of the transmission interface requirements of the system 100. Specifically, the video session manager 122 is coupled to subscriber equipment 106 via a forward information channel 132, a forward command channel 133 and a back channel 134. All three of these channels are supported by the transport subsystem 104. It is noted that the transport subsystem 104

can include any one of a number of conventional broadband communications networks that are available such as a fiber optic network, a telephone network, existing cable television network and the like.

The video session manager contains a transport processor 122-TP for packetizing the information provided by the information server via data path 116. The video session manager also contains a digital video modulator (DVM) 122-DVM for modulating the server data streams onto one or more carrier frequencies that are compatible with the transmission requirements of the network 104. The output of the digital video modulator 122-DVM is coupled to the forward information channel of the transport subsystem 104. Additionally, the video session manager contains a modem for sending control information via the forward command channel and receiving control information via the back channel (see Appellant's specification page 6, lines 7-22, and FIG. 1).

The transport processor 122-TP and the digital video modulator (DVM) 122-DVM of the video session manager 122 are subject to respective maximum data rates. That is, the bandwidth or maximum data processing or transmission rates of the transport processor 122-TP and the digital video modulator (DVM) 122-DVM operate to limit the amount of data that may be delivered by the system to the subscribers. Thus, the information processing system 100 of FIG. 1 is bandwidth constrained by the video switch 108-SW, the various data paths such as data path 116 and the forward channel 132, the transport processor 122-TP and the digital video modulator 122-DVM (see Appellant's specification page 6, lines 23-32, and FIG. 1).

A present utilization level for each of these systems may be determined empirically or by calculation. In one embodiment, the video switch 108-SW, the transport processor 122-TP and the digital video modulator 122-DVM indicate respective present utilization levels to the CPU 110 of the information server 108 and, optionally, to the CPU 124 of the session manager 122. In another embodiment of the invention, the bandwidth utilization levels of the respective bandwidth constraining system components are modeled based upon expected component loading levels. The component loading levels are determined with respect to the type of information requested by subscribers (high definition audio-visual, standard definition audio-visual,

still or moving imagery, various audio formats and other data, such as internet web pages and block file transfers). By modeling the bandwidth requirements of data requested by each subscriber within the system and aggregating this information the system is able to control the bandwidth utilization levels such that information degradations can be managed in an orderly fashion (see Appellant's specification page 6, line 32 to page 7 line 3).

Referring now to the subscriber equipment 106, each set top terminal 136 receives the data streams from the forward information channel 132, demodulates those streams and processes them for display on the display device 140 (e.g., a conventional television). In addition, the set top terminal 136 accepts commands from a remote control input device 138 or other input device. These commands are formatted, compressed, modulated, and transmitted through the network 104 to the video session manager 122. Typically, this transmission is accomplished through the back channel 134. These commands are preferably transmitted through the same network used to transmit information to the set top terminal. However, the back channel coupling the set top terminal to the server may be a separate network, e.g., a forward information channel through a television cable network and a back channel through a telephone network (see Appellant's specification page 7, line 28 to page 8, line 5, and FIG. 1).

The inventive information distribution system 100 provides bandwidth management functionality on an individualized basis to each of a plurality of subscribers requesting video and other information by adapting various parameters of the provided video or other information based upon the processing, transmission and memory bandwidth available to the system 100 at the time the video or other information is requested. Referring to FIG. 1, the video session manager 122 of the system 100 establishes a session (204) with a subscriber or customer. For example, the subscriber equipment interacts with the provider equipment such that a particular physical channel and logical channel is assigned to the subscriber. The subscriber then utilizes information received via the assigned channel to begin presenting, e.g., a program navigation display screen or other welcome display screen.

At step 206 of FIG. 2, bandwidth sufficient to enable a navigation function is allocated to the subscriber or customer of step 204. The navigation function provides an interactive means for a subscriber to browse and select for subsequent viewing video information within a video and demand system. For purposes of this disclosure it is assumed that such a navigation function requires a bandwidth of approximately 3.3 million bits per second (Mbps). Thus, at step 206, 3.3Mbps of bandwidth is reserved for the customer or subscriber of step 204 (see Appellant's specification page 8, line 19 to page 9, line 4 and FIG. 2).

At step 208 the provider equipment waits for a programming request from the subscriber. Upon receiving a program request, the bandwidth required to provide the requested programming is determined. That is, a determination is made as to the amount of bandwidth required, from each of at least one bandwidth constrained resource, to process the request. This determination also considers the existing load placed upon the at least one bandwidth constrained resource due to other requests presently being satisfied by the information provider. As noted with respect to box 212, the bandwidth determination is made with respect to bandwidth requirements for at least one of video server resources (114-1, 108), video switch resources (108-SW), transport processor resources (122-TP), digital video modulator resources (122-DVM) and other system resources (see Appellant's specification page 9, lines 5-17 and FIG. 2).

At step 214, a query is made as to whether sufficient bandwidth exists to satisfy the programming requests. If the query at step 214 is answered affirmatively, the requested programming is provided to the customer or subscriber using the bandwidth appropriate to the requested programming. For example, in the case of the requested programming comprising a high definition program having an appropriate bandwidth of 9Mbps from one or more of the various resources noted in box 212, and such bandwidth being available, the requested program is retrieved from the appropriate bandwidth programs 114-1A portion of the data storage unit 114-1 and provided to the subscriber (see Appellant's specification page 9, lines 17-29 and FIG. 2).

If the query at step 214 is answered negatively, then a query is made as to whether a minimum amount of bandwidth is available. That is, a query is made as to whether an amount of bandwidth sufficient to provide a minimum level of quality for the

requested program is available (e.g., encoded to provide at least a minimum quality level). For example, in the case of the requested programming comprising a high definition program having an appropriate bandwidth of 9Mbps from one or more of the various resources noted in box 212, and only a minimum bandwidth of 5Mbps being available, the requested program is retrieved from the minimum bandwidth programs 114-1M portion of the data storage unit 114-1 and provided to the subscriber.

If the query at step 218 is answered negatively, then the system enters a bandwidth starvation mode (i.e., an error mode). In the bandwidth starvation mode the requested program may be provided using the available bandwidth, regardless of quality degradation, as is presently done in known video on demand systems. However, providing requested content using such insufficient bandwidth will likely result in a very poor quality presentation to at least the subscriber. Thus, rather than providing a severely degraded program to a subscriber (one likely to annoy the subscriber), in the absence of even the minimal amount of bandwidth, it is preferred that the subscriber be denied access to the requested programming after a predetermined time period waiting for sufficient bandwidth to become available (see Appellant's specification page 9, line 30 to page 10, line 19 and FIG. 2).

It is noted that in a system 100 of FIG. 1, a large number of subscribers or consumers are serviced and the bandwidth utilization levels fluctuate greatly even a brief period of time. In the case of a minimal or sufficient level of bandwidth becoming available, the requested program is provided to the customer using respectively a minimal bandwidth level or an appropriate bandwidth level. Thus, the above-described invention provides an efficient mechanism for ensuring that subscribers receive requested information conforming to at least a minimal level of quality while managing the bandwidth constraints within an information distribution system (see Appellant's specification page 10, line 19-30).

As suggested in MPEP 1206, Appellant now reads one of the broadest appealed claims on the specification and the drawings. However, it should be understood that the appealed claim may read on other portions of the specification or other figures that are not listed below.

More specifically, in one embodiment of the present invention, a method is provided for determining whether a VOD distribution system has sufficient bandwidth available to provide VOD content requested by a subscriber. In the event of appropriate bandwidth availability, the requested VOD content is provided from the provider equipment to the subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth. Otherwise, in the event of minimum bandwidth availability, the requested VOD content is provided from the provider equipment to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth (See Appellant's specification, Page 5, lines 8-32 and Figure 1).

For the convenience of the Board of Patent Appeals and Interferences, Appellant's claim 17 (one of the broadest independent claims) is presented below in claim format with elements read on FIG. 3 of the drawings, as suggested in MPEP 1206. Claim 1 positively recites (with reference numerals added):

1. In a video-on-demand (VOD) distribution system (100) comprising provider equipment and subscriber equipment (106), said provider equipment providing VOD content to said subscriber equipment (106) via a forward channel (132), said subscriber equipment requesting said VOD content via a back channel (134), a method comprising the steps of:
 - determining (210) whether said VOD distribution system (100) has sufficient bandwidth available to provide VOD content requested by a subscriber;
 - providing (216), in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content (114-1A) encoded in a manner adapted to utilize said appropriate bandwidth; and
 - providing (220), in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content (114-1M) encoded in a manner adapted to utilize minimum bandwidth.

Issues Presented

Whether claims 17-22, 24-36, and 38-44 are patentable under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter "Ravi"), as well as Ravi in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998), and in further view of the Hang patent (United States Patent No. 5,115,309, issued May 19, 1992).

Grouping of Claims

The rejected pending claims 17-22, 24-36, and 38-44 have been grouped together in the rejection. Appellant urges that each of the rejected claims stands on its own recitation, the claims being considered to be separately patentable for reasons set forth below in more detail.

The References

The following references are relied on by the Examiner:

| <u>Author</u> | <u>Publication Title or Reference Number</u> | <u>Publication Date</u> |
|---------------|--|-------------------------|
| Ravi et al. | United States Patent: 6,292,834 | September 18, 2001 |
| Brown | United States Patent: 5,822,530 | October 13, 1998 |
| Hang | United States Patent: 5,115,309 | May 19, 1992 |

Brief Description of the References

United States Patent No. 6,292,834 to Ravi et al. (hereinafter "Ravi") teaches providing efficient transmission of multimedia streams from a server to a client computer over a diverse computer network including local area networks and wide area networks (LAN/WAN), such as the internet (see Ravi, col. 3, lines 1-10 and FIG. 1). The main focus of Ravi is to resolve problems associated with bandwidth requirements, which may vary significantly depending on the type of multimedia data being delivered. A first problem is the average transmission capacity, where a network connection may be unable to keep up with the demands of the server/client stream traffic, i.e., the average bandwidth capacity of the network connection may be insufficient. Consequently, data packets will arrive at the client computer later and later in time, causing the input buffer (of the client computer) to empty at a faster rate than it can be replenished, and eventually depleting the input buffer (see Ravi, col. 1, lines 65-67, and col. 2, lines 9-33).

A second problem is the rate of change of bandwidth capacity over time of the network connection. Since overall traffic within the internet is not constant, and since the internet is packet-switched, the bandwidth capacity provided by the internet for the network connection can vary dynamically over time. Accordingly, if an application is too

aggressive in demanding bandwidth, during peak demand periods, the internet may be unable to cope with the peak demand, causing packets to be discarded/lost and requiring retransmission, which further degrades overall performance of the network connection. In real-time application, e.g., video on demand (VOD) application, the discarded/lost packets result in jitter, where jitter is defined as the second order timing difference in the packet arrival times (see Ravi, col. 2, lines 35-63).

The Ravi patent overcomes these problems in a VOD system that streams data packets from a stream server 220 to a client device 240, by optimally utilizing the bandwidth of the connection provided by the computer network 290, while minimizing the loss of packets. In one embodiment, the transmission rate of the data stream is dynamically adjusted in response to changes in the bandwidth made available by the computer network 290 for the network connection between the server 220 and the client computer 240. Accordingly, the server 220, in response to feedback from the client computer 240, dynamically selects transmission rates in order to better match the varying bandwidth capacity of the network connection. For example, server 220 streams video packets at 1 frame/second (fps), 5 fps, 10 fps, and 15 fps for bandwidths of 4 kbits/second (kbps), 14 kbps, 18 kbps, and 44 kbps (see Ravi, col. 6, lines 32-47 and FIG. 2).

Ravi further discloses that the client computer 240 comprises a playout buffer 366, which stores several seconds, e.g., 5 seconds, worth of data packets from the data stream sent from the server 220. The buffer 366 enables data packets to independently traverse the computer network 290, arrive at the client computer 240 in a different order than they were originally transmitted, and be rearranged back to their original sequential order prior to processing by decoder 364 and renderer 365. Playout buffer 366 also enables retransmitted (lost) packets to be inserted in their originally sequential order prior to processing by decoder 364 (see Ravi, col. 6, lines 48-58 and FIG. 3).

Referring to FIG. 4, Ravi teaches that at step 410, the performance variables are computed. At step 420, the computed performance variables are used to determine if it is desirable to decrease the bandwidth, and if so, then in step 430, the bandwidth is decreased. If a bandwidth decrease is not desirable, then in step 440, the performance variables are used to determine if it is desirable to increase the bandwidth. If a

bandwidth increase is desirable, then in step 450, the bandwidth is increased (see Ravi, col. 7, lines 16-26, FIGS. 4 and 5A). It is noted that within the context of server 220 and client computer 240, the term "bandwidth" is synonymous to the "transmission rate" (see Ravi, col. 6, line 66 to col. 7, line 2).

United States Patent No. 5,822,530 to Brown teaches an interactive video-on-demand (VOD) system receiving a request for video content and determining if transmission of a version of the VOD content will constrain resources in the VOD system. If the system's resources will not be constrained, the VOD system provides the requesting viewer with the VOD version of the interactive application. Otherwise, if the VOD system's resources would be constrained by the transmission of the VOD version, then the VOD system (1) denies the request for VOD content, and (2) directs the requesting viewer to view a near-video-on-demand (NVOD) version of the particular application (see Brown, col. 1, line 63 to col. 4, line 4).

The main focus of Brown is to resolve problems associated with shared resources, such as server resources, communication network transmission bandwidth, switching resources, among others for the interactive VOD system, which may vary significantly and have finite resources due to financial considerations. The Ravi patent overcomes these problems in a VOD system by first determining whether the systems resources would be constrained. If the resources are not constrained, then the VOD content is sent to a requesting subscriber. However, if the resources are constrained, then the request for VOD content is denied, and NVOD content is sent as a substitute for the VOD content to the requesting subscriber (see Brown, col. 2, lines 46-61, col. 5, lines 8-33, and FIG. 5).

United States Patent No. 5,115,309 to Hang teaches a dynamic channel allocation unit for specifying a bit rate for each video coder in a set of parallel video coders comprising an overall video coder. The main focus of Brown is to resolve problems associated with compressing HDTV signals. Specifically, an HDTV image may be divided into sub-images, where the sub-images are processed in parallel. However, the complexity of each sub-image may vary considerably, thereby making it difficult and expensive to specify a bit rate for each encoder so as to dynamically

allocate the available bandwidth most efficiently (see Hang, col. 1, line 61 to col. 2, line 16).

The Hang patent overcomes these problems by implementing a dynamic channel allocation unit that computes a set of channel sharing factors, i.e., the percentage of the total channel bandwidth to be allocated to a particular video coder. Specifically, a dynamic channel allocation unit is supplied with an average quantization step size and an average number of bits produced per pel employed by each video coder for the image contained in the previous frame. Thereafter, an initial set of estimates of the channel sharing factors, i.e., an indication of the percentage of the total channel bandwidth that is to be allocated to a particular video coder, is derived. One channel sharing factor is computed for each individual video coder. Individual members of the set of estimates may thereafter be further refined to reflect prior history of the channel sharing factors. Additionally, the set of estimates may be normalized to reflect the actual number of bits that can actually be produced by each individual coder. The dynamic channel allocation unit supplies as an output to each individual video coder a channel allocation factor which is the final estimated member of the estimated channel sharing factor set corresponding to that video coder (See Hang, Abstract and col. 2, lines 18-45).

ARGUMENTS

THE ISSUES UNDER 35 U.S.C. §103

It is submitted that a reasonable interpretation of the references as proposed by the Examiner in the first and second non-final office actions, as well as the Final Office Action would not have resulted in the invention recited in the Appellant's claims.

A. 35 U.S.C. §103 – Claim 17

The Examiner has rejected claim 17 in paragraph 3 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter "Ravi"). The rejection is respectfully traversed.

First, the Examiner alleges that Ravi discloses:

the video on demand distribution system (i.e., Ravi FIG. 2), comprising:
provider equipment for providing VOD (i.e., FIG. 2, server 220), subscriber equipment requesting the VOD content via a back channel (i.e., FIG. 2, client 240, and a forward channel and a back channel (i.e., FIG. 2, bi-directional or double sided arrows);

determining whether the VOD distribution system has sufficient bandwidth available to provide VOD content to subscriber and providing in the event of appropriate bandwidth availability, the requested VOD content to subscriber using content encoded in a manner adapted to utilize the appropriate bandwidth, and providing VOD content to subscriber in the event of minimum bandwidth availability using content encoded in a manner adapted to utilize minimum bandwidth (i.e., FIG. 4, 5a-5e, abstract, lines 5-12 and col. 6, lines 64-67), where discloses dynamically adjust the transmission rate of the VOD to optimize usage of the bandwidth (utilize the appropriate bandwidth), and interface circuit (Fig. 1, 112) is used to send and receive information and is coupled to the information server.

The Examiner further alleges that although Ravi fails to explicitly teach the claimed "minimum bandwidth availability", Ravi teaches efficient VOD transmission and dynamically adjust/matched the transmission rate of the VOD to optimize usage of the bandwidth (utilize the appropriate bandwidth) as discussed above. Accordingly, it would have been obvious to one having ordinary skill in the art to realize that the bandwidth is limited and as some point would have the minimum bandwidth and at some point the maximum bandwidth threshold.

Appellant respectfully disagrees with the Examiners reading of the cited reference. The Board's attention is directed to the fact that Ravi fails to teach or suggest Appellant's "providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth." Specifically, Appellant's independent claim 17 recites:

"17. In a video-on-demand (VOD) distribution system comprising provider equipment and subscriber equipment, said provider equipment providing VOD content to said subscriber equipment via a forward channel, said subscriber equipment requesting said VOD content via a back channel, a method comprising the steps of:

determining whether said VOD distribution system has sufficient bandwidth available to provide VOD content requested by a subscriber;

providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and
providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth.” (emphasis added).

The Appellant's invention teaches a method for adapting a level of service in response to an amount of bandwidth available within a video on demand (VOD) information distribution system. Namely, Appellant's invention teaches providing, in the event of appropriate bandwidth availability, the requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize the appropriate bandwidth, and providing, in the event of minimum bandwidth availability, the requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth. Referring to FIG. 1, data storage unit 114-1 is depicted as storing appropriate bandwidth programs 114-1A and minimal bandwidth programs 114-1M. “Appropriate bandwidth programs 114-1A comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget that is appropriate to the program in terms of visual or aural encoding quality. For example, a high definition program that has been encoded to provide sufficient information such that a high quality presentation of the high definition program may be provided via the subscriber equipment. By contrast, minimal bandwidth programs 114-1M comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget representing a minimal level in terms of visual or aural encoding quality. For example, a high definition program that has been encoded to provide sufficient information such that only a standard quality presentation of the high definition program may be provided via the subscriber equipment” (see Appellant's specification, page 5, lines 8-22, and FIGS. 1 and 2).

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 U.S.P.Q. 1021, 1024 (Fed. Cir. 1984) (emphasis added). The Ravi reference fails to teach or suggest the Appellant's invention as a whole.

In particular, Ravi discloses that performance variables are computed and the computed performance variables are used to determine if it is desirable to decrease bandwidth. If so, the bandwidth is decreased, otherwise the bandwidth decrease is not desirable and the performance variables are used to determine if it is desirable to increase the bandwidth. If a bandwidth increase is desirable, then the bandwidth is increased (see Ravi, column 7, lines 16-26, Figs. 4 and 5a through 5e).

The Ravi reference is completely silent with regard to using stored content encoded in a manner adapted to utilize the appropriate bandwidth, or in the event of minimum bandwidth availability, using stored content encoded in a manner adapted to utilize minimum bandwidth. Rather, The Ravi reference merely discloses that the content is stored in a storage device, such as hard disk drive 110 of computer system 100 of FIG. 1. Computer system 100, as illustratively shown in FIG. 1 of the Ravi reference, represents an exemplary computer system in which components of the VOD system, such as the production station 210, a stream server 220, at least one web server 230, and at least one client computer 240 may be implemented. However, nowhere in the Ravi reference is there any teaching or suggestion that Ravi's versions of the video content may be stored, where the first version of the stored content is stored as encoded content in a manner adapted to utilize an appropriate bandwidth, and a second version of encoded content, which is stored in the manner adapted utilize minimum bandwidth.

By contrast, the Ravi reference merely discloses that the transmission rate of content may be dynamically decreased or increased by changing the transmission rate from the server to the client computer in response to the measurement of a number of data packets currently in a playout buffer of the client device going below or rising above a predetermined threshold. Specifically, the transmission rate of the data stream is dynamically adjusted in response to changes in the bandwidth made available by the computer network 290 for the network connection between server 220 and client computer 240. Accordingly, server 220, in response to feedback from client computer 240, dynamically selects transmission rates in order to better match the varying bandwidth capacity of the network connection (see, Ravi, col. 6, lines 37-43).

In other words, the Ravi reference merely teaches changing transmission rates of the streamed content, as opposed to providing content that is stored at the storage device of the service provider equipment in a manner associated with appropriate bandwidth availability, as well as that is already stored at the storage device of the service provider equipment in a manner associated with minimum bandwidth availability. That is, Ravi teaches changing transmission rates, while the Appellant's invention teaches retrieving pre-stored content that is encoded to accommodate various bandwidth levels. Therefore, since the Ravi reference fails to teach or even suggest "providing in event of the appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth, and providing in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth", the Ravi reference fails to teach or suggest the applicant's invention as a whole.

As such, the applicant submits that independent claim 17 is not obvious and fully satisfies the requirements under 35 U.S.C. §103 and is patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

B. 35 U.S.C. §103 – Claim 30

The Examiner has rejected claim 30 in paragraph 3 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter "Ravi"). The rejection is respectfully traversed.

First, the Examiner alleges that Ravi discloses:

the video on demand distribution system (i.e., Ravi FIG. 2), comprising:
provider equipment for providing VOD (i.e., FIG. 2, server 220), subscriber equipment requesting the VOD content via a back channel (i.e., FIG. 2, client 240, and a forward channel and a back channel (i.e., FIG. 2, bi-directional or double sided arrows);

determining whether the VOD distribution system has sufficient bandwidth available to provide VOD content to subscriber and providing in the event of appropriate bandwidth availability, the requested VOD content to subscriber using content encoded in a manner adapted to utilize the appropriate bandwidth,

and providing VOD content to subscriber in the event of minimum bandwidth availability using content encoded in a manner adapted to utilize minimum bandwidth (i.e., FIG. 4, 5a-5e, abstract, lines 5-12 and col. 6, lines 64-67), where discloses dynamically adjust the transmission rate of the VOD to optimize usage of the bandwidth (utilize the appropriate bandwidth), and interface circuit (Fig. 1, 112) is used to send and receive information and is coupled to the information server.

The Examiner further alleges that although Ravi fails to explicitly teach the claimed "minimum bandwidth availability", Ravi teaches efficient VOD transmission and dynamically adjust/matched the transmission rate of the VOD to optimize usage of the bandwidth (utilize the appropriate bandwidth) as discussed above. Accordingly, it would have been obvious to one having ordinary skill in the art to realize that the bandwidth is limited and as some point would have the minimum bandwidth and at some point the maximum bandwidth threshold.

Appellant respectfully disagrees with the Examiners reading of the cited reference. The Board's attention is directed to the fact that Ravi fails to teach or suggest Appellant's "providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth." Specifically, Appellant's independent claim 30 recites:

"30. In an video-on-demand (VOD) distribution system comprising provider equipment and subscriber equipment, said provider equipment providing VOD content to said subscriber equipment via a forward channel, said subscriber equipment requesting said information via a back channel, provider equipment apparatus comprising:

a session manager, for receiving VOD content requests from said subscriber equipment and determining, for each received request, whether said VOD distribution system has sufficient bandwidth available to provide the requested VOD content; and

an information server, coupled to said session manager, for providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability." (emphasis added).

The Appellant's invention teaches an apparatus for providing requested VOD

content using stored content encoded in a manner adapted to utilize an appropriate bandwidth. Namely, Appellant's invention teaches for providing the requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing the requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.

Referring to FIG. 1, data storage unit 114-1 is depicted as storing appropriate bandwidth programs 114-1A and minimal bandwidth programs 114-1M. "Appropriate bandwidth programs 114-1A comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget that is appropriate to the program in terms of visual or aural encoding quality. For example, a high definition program that has been encoded to provide sufficient information such that a high quality presentation of the high definition program may be provided via the subscriber equipment. By contrast, minimal bandwidth programs 114-1M comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget representing a minimal level in terms of visual or aural encoding quality. For example, a high definition program that has been encoded to provide sufficient information such that only a standard quality presentation of the high definition program may be provided via the subscriber equipment" (see Appellant's specification, page 5, lines 8-22, and FIGS. 1 and 2).

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 U.S.P.Q. 1021, 1024 (Fed. Cir. 1984) (emphasis added). The Ravi reference fails to teach or suggest the Appellant's invention as a whole.

In particular, Ravi discloses that performance variables are computed and the computed performance variables are used to determine if it is desirable to decrease bandwidth. If so, the bandwidth is decreased, otherwise the bandwidth decrease is not desirable and the performance variables are used to determine if it is desirable to increase the bandwidth. If a bandwidth increase is desirable, then the bandwidth is increased (see Ravi, column 7, lines 16-26, Figs. 4 and 5a through 5e).

The Ravi reference is completely silent with regard to using stored content encoded in a manner adapted to utilize the appropriate bandwidth, or in the event of minimum bandwidth availability, using stored content encoded in a manner adapted to utilize minimum bandwidth. Rather, The Ravi reference merely discloses that the content is stored in a storage device, such as hard disk drive 110 of computer system 100 of FIG. 1. Computer system 100, as illustratively shown in FIG. 1 of the Ravi reference, represents an exemplary computer system in which components of the VOD system, such as the production station 210, a stream server 220, at least one web server 230, and at least one client computer 240 may be implemented. However, nowhere in the Ravi reference is there any teaching or suggestion that Ravi's versions of the video content may be stored, where the first version of the stored content is stored as encoded content in a manner adapted to utilize an appropriate bandwidth, and a second version of encoded content, which is stored in the manner adapted utilize minimum bandwidth.

By contrast, the Ravi reference merely discloses that the transmission rate of content may be dynamically decreased or increased by changing the transmission rate from the server to the client computer in response to the measurement of a number of data packets currently in a playout buffer of the client device going below or rising above a predetermined threshold. Specifically, the transmission rate of the data stream is dynamically adjusted in response to changes in the bandwidth made available by the computer network 290 for the network connection between server 220 and client computer 240. Accordingly, server 220, in response to feedback from client computer 240, dynamically selects transmission rates in order to better match the varying bandwidth capacity of the network connection (see, Ravi, col. 6, lines 37-43).

In other words, the Ravi reference merely teaches changing transmission rates of the streamed content, as opposed to providing content that is stored at the storage device of the service provider equipment in a manner associated with appropriate bandwidth availability, as well as that is already stored at the storage device of the service provider equipment in a manner associated with minimum bandwidth availability. That is, Ravi teaches changing transmission rates, while the Appellant's invention teaches retrieving stored content that is encoded to accommodate various

bandwidth levels. Therefore, since the Ravi reference fails to teach or even suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability”, the Ravi reference fails to teach or suggest the applicant’s invention as a whole.

As such, the applicant submits that independent claim 30 is not obvious and fully satisfies the requirements under 35 U.S.C. §103 and is patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

C. 35 U.S.C. §103 – Claims 18, 19, and 31

The Examiner has rejected claims 18, 19, and 31 in paragraph 3 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter “Ravi”). The rejection is respectfully traversed.

First, claims 18, 19, and 31 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi fails to teach or suggest claims 18, 19, and 31 of Appellants’ invention, since the Ravi reference fails to teach or suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.” Therefore, the Ravi reference fails to teach or suggest the applicant’s invention as a whole. As such, Appellant respectfully submits that dependent claims 18, 19, and 30 are also not made obvious by the teachings of Ravi and, as such, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Second, the Examiner alleges that Ravi discloses:

“waiting for bandwidth availability and repeating the steps of providing VOD content” reads on (FIGS. 4 and 5a-5e), determination of sufficient bandwidth and

adjustment, for requested information, therefore the step of repeating (iteration) would be necessary.”

The Appellant respectfully disagrees. The Ravi reference is completely different from the invention as recited in claims 18, 19, and 31 by Appellant. In particular, claims 18, 19, and 31 recite:

“18. The method of claim 17, further comprising the step of:
waiting, in the event of less than minimum bandwidth availability, for a predetermined period of time; and
repeating said first and second steps of providing said requested information.”

“19. The method of claim 18, further comprising the step of:
repeating, for a predetermined number of iterations, said step of waiting and said first and second steps of providing said requested VOD content.”

“31. The apparatus of claim 30, wherein:
said session manager, in response to a determination that less than a minimum bandwidth is available, waiting for a predetermined period of time and determining, for each received VOD content request not being fulfilled, whether said VOD distribution system has sufficient bandwidth available to provide the requested VOD content.”

The Ravi reference is completely silent with respect to “waiting, in the event of less than minimum bandwidth availability, for a predetermined period of time.” By contrast, the Appellant’s invention waits for a predetermined period of time, in an instance where there is less than minimum bandwidth availability, and then the method “repeats said first and second steps of providing said requested information.” (see Appellant’s specification, page 10, lines 8-26).

Further, the Ravi reference does not teach or suggest the limitations “repeating said first and second steps of providing said requested information.” Rather, Ravi merely discloses the transmission rate of the data stream is dynamically adjusted in response to changes in the bandwidth made available by the computer network 290 for the network connection between server 220 and client computer 240. Accordingly, server 220, in response to feedback from client computer 240, dynamically selects transmission rates in order to better match the varying bandwidth capacity of the network connection (see, Ravi, col. 6, lines 37-43). The Ravi reference is completely

silent regarding “repeating said first and second steps of providing said requested information”. Therefore, the Ravi reference fails to teach or suggest the Appellant’s invention as a whole.

As such, the Appellant respectfully submits that claims 18, 19, and 31 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

D. 35 U.S.C. §103 – Claims 20 and 32

The Examiner has rejected claims 20 and 32 in paragraph 4 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter “Ravi”) in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

The Examiner alleges that, as analyzed with respect to method claim 20 and apparatus claim 32, Ravi discloses:

“a video-on-demand system, and provider equipment for providing VOD (i.e., FIG. 2, server 220), and subscriber equipment (i.e., FIG. 2, client 240), and adjust bandwidth based on the VOD content (FIG. 4). [Ravi] fails to explicitly teach the claimed “denying step.” However, Brown teaches denying the request presentation (see Brown, col. 7, lines 17+).”

Appellant respectfully disagrees with the Examiners reading of the cited references. The Board’s attention is directed to the fact that neither Ravi nor Brown, either singularly or in any permissible combination, teach or suggest Appellant’s “providing in event of the appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth, and providing in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth”. Specifically, Appellant’s dependent claim 20, when combined with independent claim 17, recites:

“20. In a video-on-demand (VOD) distribution system comprising provider equipment and subscriber equipment, said provider equipment providing VOD content to said subscriber equipment via a forward

channel, said subscriber equipment requesting said VOD content via a back channel, a method comprising the steps of:

determining whether said VOD distribution system has sufficient bandwidth available to provide VOD content requested by a subscriber;

providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth;

providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth; and

denying, after said predetermined number of iterations, access to said requested VOD content to said subscriber.” (emphasis added).

The test under 35 U.S.C. §103 is not whether an improvement or a use set forth in a patent would have been obvious or non-obvious; rather the test is whether the claimed invention, considered as a whole, would have been obvious. Jones v. Hardy, 110 U.S.P.Q. 1021, 1024 (Fed. Cir. 1984) (emphasis added). The Ravi and Brown references, either singularly or in combination, fails to teach or suggest the applicants’ invention as a whole.

First, claims 20 and 32 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi and Brown references fail to teach or suggest claims 21 and 32 of Appellants’ invention, since the combined references fails to teach or suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Rather, the Ravi reference merely discloses that performance variables are computed and the computer performance variables are used to determine if it is desirable to decrease bandwidth. If so, the bandwidth is decreased, otherwise the bandwidth decrease is not desirable then the performance variables are used to determine if it is desirable to increase the bandwidth. If a bandwidth increase is desirable, then the bandwidth is increased (see Ravi, column 7, lines 16-26, Figs. 4 and 5a through 5e). Nowhere in the Ravi reference is there any teaching or suggestion of providing, in the event of appropriate bandwidth availability, “said requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize

said appropriate bandwidth." That is, the Ravi reference is silent with respect to how the content is stored. More specifically, Ravi is completely devoid of my teaching or suggestion that the content is stored (1) in a manner adapted to utilize the appropriate bandwidth, and (2) in a manner adapted to utilize a minimum bandwidth.

Furthermore, the Brown reference fails to bridge the substantial gap as between the Ravi reference and the applicant's invention. In particular, the Brown reference merely discloses determining if the transmission of a VOD version of a requested application would constrain the shared resources of the interactive communications system. The Brown reference makes this determination by utilizing a mathematical expression to determine the available capacity of the system. (See Brown, column 3, lines 26-39.) The Brown reference fails to teach or suggest providing, in the event of appropriate bandwidth availability, the requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth, and providing, in the event of minimum bandwidth availability, the requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize the minimum bandwidth. By contrast, Brown discloses that the requested VOD version of the content is provided to the subscriber if the transmission of the requested VOD version would not constrain resources of the system. On the other hand, if the system's resources would be constrained by the submission of the requested VOD version, then one embodiment of the invention (1) denies the request for this presentation, and (2) directs the requesting viewer to view a near video-on-demand (NVOD) version of the particular application. (See Brown, column 3, line 63 to column 4, line 4).

In other words, the applicant's invention provides video-on-demand content previously encoded at an appropriate bandwidth at the provider equipment to the subscribers in the event of appropriate bandwidth availability, as well content previously encoded at a minimum bandwidth level in the event of minimum bandwidth availability. By contrast, the Brown reference provides VOD content to the subscriber only in the case where appropriate bandwidth is available. In instances where minimum bandwidth availability is limited, the Brown reference teaches away from the applicant's invention, since the system of Brown merely provides a near video-on-demand version of a particular application. In NVOD programming, the interactive entertainment system

broadcasts several time-shifted versions of interactive application (i.e., broadcasts duplicate versions of the application, with the starting time of each version offset by a unique, predetermined time increment) to all of its subscribers over shared communication paths. Typically, interactive systems utilize NVOD servers to provide several presentations of a movie, where the presentation start-times are staggered so that no two presentations start at the same time (see Brown, col. 2, lines 12-22). This is completely different from the applicant's invention, since the applicant's invention is able to provide video-on-demand content in instances where there is also minimum bandwidth availability.

Even if the two references could somehow be operably combined, the combination would merely disclose computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest "providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth," the combination of Ravi and Brown fails to teach the applicant's invention as a whole.

Second, the combination of Ravi and Brown fails to teach or suggest the feature:

"denying, after said predetermined number of iterations, access to said requested VOD content to said subscriber."

Specifically, the Ravi reference is completely silent with respect to denying VOD content after a predetermined number of iterations. Further, the Brown reference merely discloses if (at step 520) a determination is made that the VOD customer-count variable N equals the maximum VOD-customer-count value, the process transitions to

step 530 to deny the request for the VOD presentation in order to conserve the resources of the interactive system. Variable N represents the number of customers that are currently viewing VOD versions of the particular interactive application (see Brown, col. 6, lines 19-24 and col. 5, line 67 to col. 6, line 2).

By contrast, the Appellant's invention denies access to the requested VOD content to the subscriber after a predetermined number of iterations. In particular, "in the absence of even the minimal amount of bandwidth it is preferred that the subscriber be denied access to the requested programming after a predetermined time period waiting for sufficient bandwidth to become available" (see Appellant's specification, page 10, lines 16-19). Therefore, since the combination of Ravi and Brown fails to teach or suggest "denying, after said predetermined number of iterations, access to said requested VOD content to said subscriber," the combined references fails to teach or suggest the Appellant's invention as a whole.

As such, the combination of Ravi and Brown fails to teach or suggest each and every element in claims 20 and 32 of Appellant's invention. Therefore, the Appellant respectfully submits that claims 20 and 32 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

E. 35 U.S.C. §103 – Claims 21 and 33

The Examiner has rejected claims 21 and 33 in paragraph 4 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter "Ravi") in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

Claims 21 and 33 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi and Brown references fail to teach or suggest claims 21 and 33 of Appellant's invention, since the combined references fail to teach or suggest "providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said

requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Rather, the Ravi reference merely discloses that performance variables are computed and the computer performance variables are used to determine if it is desirable to decrease bandwidth. If so, the bandwidth is decreased, otherwise the bandwidth decrease is not desirable then the performance variables are used to determine if it is desirable to increase the bandwidth. If a bandwidth increase is desirable, then the bandwidth is increased (see Ravi, column 7, lines 16-26, Figs. 4 and 5a through 5e). Nowhere in the Ravi reference is there any teaching or suggestion of providing, in the event of appropriate bandwidth availability, “said requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth.” That is, the Ravi reference is silent with respect to how the content is stored. More specifically, Ravi is completely devoid of my teaching or suggestion that the content is stored (1) in a manner adapted to utilize the appropriate bandwidth, and (2) in a manner adapted to utilize a minimum bandwidth.

Furthermore, the Brown reference fails to bridge the substantial gap as between the Ravi reference and the applicant's invention. In particular, the Brown reference merely discloses determining if the transmission of a VOD version of a requested application would constrain the shared resources of the interactive communications system. The Brown reference makes this determination by utilizing a mathematical expression to determine the available capacity of the system. (See Brown, column 3, lines 26-39.) The Brown reference fails to teach or suggest providing, in the event of appropriate bandwidth availability, the requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth, and providing, in the event of minimum bandwidth availability, the requested VOD content to the subscriber using stored content encoded in a manner adapted to utilize the minimum bandwidth. By contrast, Brown discloses that the requested VOD version of the content is provided to the subscriber if the transmission of the requested VOD version would not constrain resources of the system. On the other hand, if the system's resources would be constrained by the submission of the requested VOD version, then one embodiment of the invention (1) denies the request for this presentation, and (2)

directs the requesting viewer to view a near video-on-demand (NVOD) version of the particular application. (See Brown, column 3, line 63 to column 4, line 4).

In other words, the applicant's invention provides video-on-demand content previously encoded at an appropriate bandwidth at the provider equipment to the subscribers in the event of appropriate bandwidth availability, as well content previously encoded at a minimum bandwidth level in the event of minimum bandwidth availability. By contrast, the Brown reference provides VOD content to the subscriber only in the case where appropriate bandwidth is available. In instances where minimum bandwidth availability is limited, the Brown reference teaches away from the applicant's invention, since the system of Brown merely provides a near video-on-demand version of a particular application. In NVOD programming, the interactive entertainment system broadcasts several time-shifted versions of interactive application (i.e., broadcasts duplicate versions of the application, with the starting time of each version offset by a unique, predetermined time increment) to all of its subscribers over shared communication paths. Typically, interactive systems utilize NVOD servers to provide several presentations of a movie, where the presentation start-times are staggered so that no two presentations start at the same time (see Brown, col. 2, lines 12-22). This is completely different from the applicant's invention, since the applicant's invention is able to provide video-on-demand content in instances where there is also minimum bandwidth availability.

Even if the two references could somehow be operably combined, the combination would merely disclose computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest "providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored contend encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability,

said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole.

As such, the Appellant respectfully submits that claims 21 and 33 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

F. 35 U.S.C. §103 – Claims 22 and 36

The Examiner has rejected claims 22 and 36 in paragraph 4 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter “Ravi”) in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

First, claims 22 and 36 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi and Brown references fail to teach or suggest claims 22 and 36 of Appellant’s invention, since the combined references fail to teach or suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Specifically, the combination merely discloses computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize

said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole. As such, Appellant respectfully submits that dependent claims 22 and 36 are not made obvious by the teachings of Ravi and Brown and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Second, the combination of Ravi and Brown fails to teach or suggest the feature:

“wherein a first level of bandwidth is allocated to each subscriber upon establishing a respective session, said first level of bandwidth being sufficient to support navigation function.” (emphasis added).

The Examiner alleges that the combination of Ravi and Brown discloses:

“the variable bandwidth and adjustment to support navigation (FIG. 4 of Ravi) and storing information reads on (FIG. 1 of Ravi).”

The Appellant respectfully disagrees. With respect to FIG. 4 of Ravi, Ravi discloses:

“that performance variables are computed and the computer performance variables are used to determine if it is desirable to decrease bandwidth. If so, the bandwidth is decreased, otherwise the bandwidth decrease is not desirable then the performance variables are used to determine if it is desirable to increase the bandwidth. If a bandwidth increase is desirable, then the bandwidth is increased” (see Ravi, column 7, lines 16-26, Figs. 4 and 5a through 5e).

Nowhere in the Ravi reference is there any teaching or suggestion of “said first level of bandwidth being sufficient to support navigation function.” Rather, the Ravi reference, as well as the Brown reference is completely silent with respect to supporting navigation functions of a set-top terminal. Therefore, the combination of Ravi and Brown fails to teach or suggest the Appellant’s invention as a whole.

As such, the Appellant respectfully submits that claims 22 and 36 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

G. 35 U.S.C. §103 – Claims 24 and 38

The Examiner has rejected claims 24 and 38 in paragraph 4 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter “Ravi”) in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

First, claims 24 and 38 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi and Brown references fails to teach or suggest claims 24 and 38 of Appellant’s invention, since the combined references fail to teach or suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Specifically, the combination merely discloses computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole. As such, Appellant respectfully submits that dependent claims 24 and 38 are not obvious by the teachings of Ravi and Brown and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Second, the combination of Ravi and Brown fails to teach or suggest the feature:

“wherein said appropriate bandwidth level represents a bandwidth level sufficient to provide said requested information to said subscriber without qualitatively degrading said requested information, and said minimum bandwidth level represents a bandwidth level sufficient to provide said requested information to said subscriber where said requested information is qualitatively degraded.” (emphasis added).

The Examiner alleges that the combination of Ravi and Brown discloses:

“the BW-threshold and adjusting to avoid quality degrading” (FIGS. 4 and 5a-5e of Ravi).”

The Appellant respectfully disagrees. With respect to FIGS. 4 and 5a-5e of Ravi, Ravi discloses:

“that performance variables are computed and the computer performance variables are used to determine if it is desirable to decrease bandwidth. If so, the bandwidth is decreased, otherwise the bandwidth decrease is not desirable then the performance variables are used to determine if it is desirable to increase the bandwidth. If a bandwidth increase is desirable, then the bandwidth is increased” (see Ravi, column 7, lines 16-26, Figs. 4 and 5a through 5e).

Nowhere in the Ravi reference is there any teaching or suggestion of “said minimum bandwidth level represents a bandwidth level sufficient to provide said requested information to said subscriber where said requested information is qualitatively degraded.” Rather, the combined references disclose that if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving nothing at all or NVOD content, as opposed to receiving VOD content that is qualitatively degraded in the event of minimum bandwidth availability. In other words, the Appellant’s invention provides requested information that is qualitatively degraded in instances of minimum bandwidth availability, as opposed to either denying the request completely, or providing NVOD content instead of qualitatively degraded VOD content. Therefore, the combination of Ravi and Brown fails to teach or suggest the Appellant’s invention as a whole.

As such, the Appellant respectfully submits that claims 24 and 38 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

H. 35 U.S.C. §103 – Claims 34 and 35

The Examiner has rejected claims 34 and 35 in paragraph 4 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter “Ravi”) in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

Claims 34 and 35 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi and Brown references fail to teach or suggest claims 34 and 35 of Appellant’s invention, since the combined references fail to teach or suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Specifically, the combination merely discloses computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole.

As such, the Appellant respectfully submits that claims 34 and 35 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

I. 35 U.S.C. §103 – Claim 44

The Examiner has rejected claim 44 in paragraph 4 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter “Ravi”) in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

First, dependent claim 44 respectively depends from independent 30, and recites additional features thereof. The Ravi and Brown references fail to teach or suggest claim 44 of Appellant’s invention, since the combined references fail to teach or suggest “providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Specifically, the combination merely discloses computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole. Since the combination of Ravi and Brown fails to teach or suggest claim 44 of Appellant’s

invention, Appellant respectfully submits that dependent claim 44 is not made obvious by the teachings of Ravi and Brown and, as such, fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

Second, the Examiner alleges that the combination of Ravi and Brown discloses:

“communication system and storage, that includes information distribution and transmission to client based on the requested information, and providing variable bandwidth (FIGS. 1, 2, and 4, and abstract of Ravi), therefore it would have been obvious that the variable bandwidth depends on different encoded bit rate that depends on subscriber requests.”

The Appellant respectfully disagrees. In particular, the combination of Ravi and Brown fails to teach or suggest the feature:

“wherein each program to be provided to requesting subscribers is stored at each of an appropriate encoded bitrate and a minimal encoded bitrate.” (emphasis added).

Nowhere in the Ravi reference is there any teaching or suggestion that “each program to be provided to requesting subscribers is stored at each of an appropriate encoded bitrate and a minimal encoded bitrate.” Both references are completely silent with respect to storing the programs in a form that is an appropriate encoded bitrate and a minimal encoded bitrate. That is, Referring to FIG. 1 of Appellant’s invention, the data storage unit 114-1 is depicted as storing appropriate bandwidth programs 114-1A and minimal bandwidth programs 114-1M. Appropriate bandwidth programs 114-1A comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget that is appropriate to the program in terms of visual or aural encoding quality. For example, a high definition program may be provided, which has been encoded to provide sufficient information such that a high quality presentation of the high definition program may be displayed via the subscriber equipment. By contrast, minimal bandwidth programs 114-1M comprise those programs, such as audio-visual programs, than have been encoded utilizing a bit budget representing a minimal level in terms of visual or aural encoding quality. For example, a high definition program may be provided, which has been encoded to provide sufficient information, such that only a standard quality presentation of the high definition program may be via the subscriber equipment (see Appellant’s specification page 5, lines 8-22, and FIG. 1).

By contrast, the teachings of Ravi and Brown merely disclose the transmission rate of the data stream is dynamically adjusted in response to changes in the bandwidth made available by the computer network 290 for the network connection between the server 220 and the client computer 240. Accordingly, the server 220, in response to feedback from the client computer 240, dynamically selects transmission rates in order to better match the varying bandwidth capacity of the network connection. For example, server 220 streams video packets at 1 frame/second (fps), 5 fps, 10 fps, and 15 fps for bandwidths of 4 kbits/second (kbps), 14 kbps, 18 kbps, and 44 kbps (see Ravi, col. 6, lines 32-47 and FIG. 2).

Thus, the Appellant's invention stores video content at "at each of an appropriate encoded bitrate and a minimal encoded bitrate" as opposed to the combined references that dynamically select transmission rates in order to better match the varying bandwidth capacity of the network connection. Therefore, the combined references fail to teach or suggest the Appellant's invention as a whole.

As such, the Appellant respectfully submits that claim 44 is not obvious and fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Therefore, the Appellant respectfully requests that the rejection of this claim be reversed.

J. 35 U.S.C. §103 – Claims 25-28 and 39-42

The Examiner has rejected claims 25-29 and 39-43 in paragraph 5 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter "Ravi") in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998), and in further view of Hang (United States Patent No. 5,115,309, issued May 19, 1992). The rejection is respectfully traversed.

Claims 25-29 and 39-43 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi, Brown, and Hang references fail to teach or suggest claims 25-29 and 39-43 of Appellant's invention, since the combined references fail to teach or suggest "providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for

providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.”

Specifically, the combination merely discloses computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of minimum bandwidth availability. Since the combination fails to teach or suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole.

Furthermore, the Hang reference fails to bridge the substantial gap as between the Ravi and Brown references and the Appellant’s invention. In particular, the Hang reference merely discloses an HDTV image may be divided into sub-images, where the sub-images are processed in parallel. However, the complexity of each sub-image may vary considerably, thereby making it difficult and expensive to specify a bit rate for each encoder so as to dynamically allocate the available bandwidth most efficiently (see Hang, col. 1, line 61 to col. 2, line 16). However, nowhere in the combination of Ravi, Brown, and Hang, either singularly or in combination, is there any teaching or suggestion of suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth.”

Rather, the combined references disclose dynamically allocating the available bandwidth, and if the system resources are constrained, then either denying the request

or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving nothing at all or NVOD content, as opposed to providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth. Therefore, the combination of Ravi, Brown, and Hang fails to teach or suggest the Appellant's invention as a whole.

As such, the Appellants respectfully submit that claims 25-29 and 39-43 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

K. 35 U.S.C. §103 – Claims 29 and 43

The Examiner has rejected claims 29 and 43 in paragraph 5 of the Final Office Action as being obvious under 35 U.S.C. §103(a) over the Ravi et al. patent (United States Patent No. 6,292,834, issued September 18, 2001, hereinafter "Ravi") in view of the Brown patent (United States Patent No. 5,822,530, issued October 13, 1998). The rejection is respectfully traversed.

First, claims 29 and 43 respectively depend, either directly or indirectly, from independent claims 17 and 30, and recite additional features thereof. The Ravi and Brown references fails to teach or suggest claims 29 and 43 of Appellant's invention, since the combined references fail to teach or suggest "providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability."

Specifically, the combination merely discloses computing performance variables to determine if it is desirable to decrease or increase bandwidth, if the system resources are not constrained providing VOD content, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving NVOD content, as opposed to received VOD content in the event of

minimum bandwidth availability. Since the combination fails to teach or suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored contend encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth,” the combination of Ravi and Brown fails to teach the applicant’s invention as a whole.

Furthermore, the Hang reference fails to bridge the substantial gap as between the Ravi and Brown references and the Appellant’s invention. In particular, the Hang reference merely discloses an HDTV image may be divided into sub-images, where the sub-images are processed in parallel. However, the complexity of each sub-image may vary considerably, thereby making it difficult and expensive to specify a bit rate for each encoder so as to dynamically allocate the available bandwidth most efficiently (see Hang, col. 1, line 61 to col. 2, line 16). However, nowhere in the combination of Ravi, Brown, and Hang, either singularly or in combination, is there any teaching or suggestion of suggest “providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored contend encoded in a manner adapted to utilize said appropriate bandwidth; and providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth.”

Rather, the combined references disclose dynamically allocating the available bandwidth, and if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving nothing at all or NVOD content, as opposed to providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said minimum bandwidth. Therefore, the combination of Ravi, Brown, and Hang fails to teach or suggest the Appellant’s invention as a whole. As such, Appellant respectfully submits that dependent claims 29 and 43 are not obvious by the teachings of Ravi, Brown, and Hang and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Second, the combination of Ravi, Brown and Hang fails to teach or suggest the feature:

“wherein information requests from each of a plurality of requesting subscribers are used to provide VOD content type data for modeling the component loading levels, said subscriber requests for VOD content being aggregated to control bandwidth utilization levels such that information degradation is managed in an orderly fashion.” (emphasis added).

The Ravi, Brown, and Hang references are completely silent with respect to aggregating subscriber request for VOD content to control bandwidth utilization. Furthermore, the Hang reference merely discloses:

“prior attempts to dynamically allocate the available bandwidth among the various video coders required knowledge by an allocation unit of the variance of each individual sub-image. Extensive computing capacity at high speeds is required to compute the variance of a sub-image in the limited time available because the variance is a complex calculation. This requirement of high speed calculations causes dynamic allocation units that compute variances to be expensive.” (see Hang, col. 2, lines 6-15).

Nowhere in the combined references is there any teaching or suggestion of “wherein information requests from each of a plurality of requesting subscribers are used to provide VOD content type data for modeling the component loading levels, said subscriber requests for VOD content being aggregated to control bandwidth utilization levels such that information degradation is managed in an orderly fashion.” Rather, the combined references merely disclose that if the system resources are constrained, then either denying the request or directing the requesting viewer to view near-video-on-demand (NVOD) versions of the content. That is, a subscriber is limited to receiving nothing at all or NVOD content, as opposed to receiving VOD content that is qualitatively degraded in the event of minimum bandwidth availability.

As such, the Appellant respectfully submits that claims 29 and 43 are not obvious and fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Therefore, the Appellant respectfully requests that the rejections of these claims be reversed.

Conclusion

For the reasons advanced above, Appellants respectfully urge that the rejections of claims 17-22, 24-36, and 38-44 as being unpatentable under 35 U.S.C. §103 are improper. Reversal of the rejections in this appeal is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. If necessary, please charge any shortages in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-1316/DIVA044 and please credit any excess fees to such deposit account.

Respectfully submitted,



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APPENDIX – Pending Claims

1. (withdrawn) In an information distribution system comprising provider equipment and subscriber equipment, said provider equipment providing information to said subscriber equipment via a forward channel, said subscriber equipment requesting said information via a back channel, a method comprising the steps of:
 - determining whether said information distribution system has sufficient bandwidth available to provide information requested by a subscriber;
 - providing, in the event of appropriate bandwidth availability, said requested information to said subscriber using said appropriate bandwidth; and
 - providing, in the event of minimum bandwidth availability, said requested information to said subscriber using said minimum bandwidth.
2. (withdrawn) The method of claim 1, further comprising the step of:
 - waiting, in the event of less than minimum bandwidth availability, for a predetermined period of time; and
 - repeating said first and second steps of providing said requested information.
3. (withdrawn) The method of claim 2, further comprising the step of:
 - repeating, for a predetermined number of iterations, said step of waiting and said first and second steps of providing said requested information.
4. (withdrawn) The method of claim 3, further comprising the step of denying access to said information to said requesting subscriber.
5. (withdrawn) The method of claim 1, wherein said bandwidth determination is made with respect to at least one of a video server bandwidth, a video switch bandwidth a transport processor bandwidth and a digital video modulator bandwidth.

6. (withdrawn) The method of claim 1, wherein a first level of bandwidth is allocated to each subscriber upon establishing a session, said first level of bandwidth being sufficient to support a navigation function.

7. (withdrawn) The method of claim 1, wherein said requested information is stored in said provider equipment at an appropriate bandwidth level and at a minimum bandwidth level.

8. (withdrawn) In an information distribution system comprising provider equipment and subscriber equipment, said provider equipment providing information to said subscriber equipment via a forward channel, said subscriber equipment requesting said information via a back channel, provider equipment apparatus comprising:

a session manager, for receiving information requests from said subscriber equipment and determining, for each received information request, whether said information distribution system has sufficient bandwidth available to provide the requested information; and

an information server, coupled to said session manager, for providing said requested information at an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested information at a minimal bandwidth in the case of at least minimal bandwidth availability.

9. (withdrawn) The apparatus of claim 8, wherein:

said session manager, in response to a determination that less than a minimum bandwidth is available, waiting for a predetermined period of time and determining, for each received information request not being fulfilled, whether said information distribution system has sufficient bandwidth available to provide the requested information.

10. (withdrawn) The apparatus of claim 9, wherein:

said session manager, in response to a final determination that less than a minimum bandwidth is available, denying access to said information to said requesting subscriber.

11. (withdrawn) The apparatus of claim 8, further comprising:

a transport processor, for packetizing information provided by said information server;

said session manager determining said information distribution system bandwidth with respect to at least a bandwidth utilization level of said transport processor.

12. (withdrawn) The apparatus of claim 8, further comprising:

a plurality of data storage devices, coupled to said information server via a video switch;

said session manager determining said information distribution system bandwidth with respect to at least one a bandwidth utilization level of said video switch and a bandwidth utilization level of a storage devices including said requested information.

13. (withdrawn) The apparatus of claim 8, further comprising:

a digital video modulator, for modulating packetized information streams onto a carrier;

said session manager determining said information distribution system bandwidth with respect to a bandwidth utilization level of said digital video modulator.

14. (withdrawn) The apparatus of claim 8, wherein a first level of bandwidth is allocated to each subscriber upon establishing a session, said first level of bandwidth being sufficient to support a navigation function.

15. (withdrawn) The apparatus of claim 8, wherein said requested information is stored in said provider equipment at an appropriate bandwidth level and at a minimum bandwidth level.

16. (withdrawn) The apparatus of claim 8, wherein each program to be provided to requesting subscribers is stored at each of an appropriate encoded bitrate and a minimal encoded bitrate.

17. (currently amended) In a video-on-demand (VOD) distribution system comprising provider equipment and subscriber equipment, said provider equipment providing VOD content to said subscriber equipment via a forward channel, said subscriber equipment requesting said VOD content via a back channel, a method comprising the steps of:

determining whether said VOD distribution system has sufficient bandwidth available to provide VOD content requested by a subscriber;

providing, in the event of appropriate bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize said appropriate bandwidth; and

providing, in the event of minimum bandwidth availability, said requested VOD content to said subscriber using stored content encoded in a manner adapted to utilize minimum bandwidth.

? 18. (previously presented) The method of claim 17, further comprising the step of: waiting, in the event of less than minimum bandwidth availability, for a predetermined period of time; and repeating said first and second steps of providing said requested information.

19. (previously presented) The method of claim 18, further comprising the step of: repeating, for a predetermined number of iterations, said step of waiting and said first and second steps of providing said requested VOD content. ?

20. (previously presented) The method of claim 19, further comprising the step of denying, after said predetermined number of iterations, access to said requested VOD content to said subscriber. ?

21. (original) The method of claim 17, wherein said bandwidth determination is made with respect to at least one of a video server bandwidth, a video switch bandwidth a transport processor bandwidth and a digital video modulator bandwidth.

22. (original) The method of claim 17, wherein a first level of bandwidth is allocated to each subscriber upon establishing a respective session, said first level of bandwidth being sufficient to support a navigation function.

23. Canceled.

24. (presently presented) The method of claim 17, wherein said appropriate bandwidth level represents a bandwidth level sufficient to provide said requested information to said subscriber without qualitatively degrading said requested information, and said minimum bandwidth level represents a bandwidth level sufficient to provide said requested information to said subscriber where said requested information is qualitatively degraded.

col. 1, l. 45-62
col. 2, l. 57-61
col. 5, l. 43-47
col. 6, l. 29-34

25. (original) The method of claim 21, wherein the at least one of a video server bandwidth, a video switch bandwidth, a transport processor bandwidth and a digital video modulator bandwidth are modeled based upon expected component loading levels.

col. 3-4, l. 65+

26. (previously presented) The method of claim 25, wherein said component loading levels are determined with respect to the type of VOD content requested.

27. (previously presented) The method of claim 26, wherein said VOD content type comprises one of a video, audio, audiovisual and data type.

col.

28. (previously presented) The method of claim 27, wherein said VOD content types comprise video formats having differing quality levels.

29. (previously presented) The method of claim 26, wherein information requests from each of a plurality of requesting subscribers are used to provide VOD content type data for modeling the component loading levels, said subscriber requests for VOD content being aggregated to control bandwidth utilization levels such that information degradation is managed in an orderly fashion.

30. (currently amended) In an video-on-demand (VOD) distribution system comprising provider equipment and subscriber equipment, said provider equipment providing VOD content to said subscriber equipment via a forward channel, said subscriber equipment requesting said information via a back channel, provider equipment apparatus comprising:
a session manager, for receiving VOD content requests from said subscriber equipment and determining, for each received request, whether said VOD distribution system has sufficient bandwidth available to provide the requested VOD content; and
an information server, coupled to said session manager, for providing said requested VOD content using stored content encoded in a manner adapted to utilize an appropriate bandwidth in the case of appropriate bandwidth availability, and for providing said requested VOD content using stored content encoded in a manner adapted to utilize a minimal bandwidth in the case of at least minimal bandwidth availability.

31. (previously presented) The apparatus of claim 30, wherein:
said session manager, in response to a determination that less than a minimum bandwidth is available, waiting for a predetermined period of time and determining, for each received VOD content request not being fulfilled, whether said VOD distribution system has sufficient bandwidth available to provide the requested VOD content.

32. (previously presented) The apparatus of claim 31, wherein:
said session manager, in response to a final determination that less than a minimum bandwidth is available, denying access to said VOD content to said requesting subscriber.

33. (previously presented) The apparatus of claim 30, further comprising:
a transport processor, for packetizing information provided by said information server;

said session manager determining said VOD distribution system bandwidth with respect to at least a bandwidth utilization level of said transport processor.

34. (previously presented) The apparatus of claim 30, further comprising:
a plurality of data storage devices, coupled to said information server via a video switch;

said session manager determining said VOD distribution system bandwidth with respect to at least one a bandwidth utilization level of said video switch and a bandwidth utilization level of a storage devices including said requested information.

35. (previously presented) The apparatus of claim 30, further comprising:
a digital video modulator, for modulating packetized information streams onto a carrier;

said session manager determining said VOD distribution system bandwidth with respect to a bandwidth utilization level of said digital video modulator.

36. (original) The apparatus of claim 30, wherein a first level of bandwidth is allocated to each subscriber upon establishing a session, said first level of bandwidth being sufficient to support a navigation function.

37. Canceled.

24 = 38. (previously presented) The apparatus of claim 30, wherein said appropriate bandwidth level represents a bandwidth level sufficient to provide said requested VOD content to said subscriber without qualitatively degrading said requested VOD content, and said minimum bandwidth level represents a bandwidth level sufficient to provide

said requested VOD content to said subscriber where said requested VOD content is qualitatively degraded.

25 = 39. (original) The apparatus of claim 30, wherein the at least one of a video server bandwidth, a video switch bandwidth, a transport processor bandwidth and a digital video modulator bandwidth are modeled based upon expected component loading levels.

26 = 40. (original) The apparatus of claim 39, wherein said component loading levels are determined with respect to the type of information requested.

27 = 41. (original) The apparatus of claim 40, wherein said information type comprises one of a video, audio, audiovisual and data type.

28 = 42. (original) The apparatus of claim 41, wherein said information types comprise video formats having differing quality levels.

29 = 43. (previously presented) The apparatus of claim 40, wherein information requests from each of a plurality of requesting subscribers are used to provide VOD content type data for modeling the component loading levels, said subscriber requests for VOD content being aggregated to control bandwidth utilization levels such that information degradation is managed in an orderly fashion.

44. (original) The apparatus of claim 30, wherein each program to be provided to requesting subscribers is stored at each of an appropriate encoded bitrate and a minimal encoded bitrate.